

## CLAIMS

What is claimed is:

1. A system for multiuser detection of a received signal, the received signal including voice signals and data signals, said system comprising:
  - a first detector having an input to receive the received signal and an output, said first detector extracting the data signals from the received signal;
  - a hard decision converter having an input connected to said first detector output and an output, said hard decision converter converting soft symbols output by said first detector into hard symbols;
  - an interference canceller having a first input configured to receive the received signal and a second input connected to said hard decision converter output, and an output, said interference canceller canceling a contribution of the data signals from the received signal; and
  - a second detector having an input connected to said interference canceller output, said second detector extracting individual voice signals, said second detector being a different detector type than said first detector.
2. The system according to claim 1, further comprising a data buffer having an input to receive the received signal and an output coupled to the first input of the interference canceller.
3. The system according to claim 1, wherein said first detector output is also connected to a symbol processing device; and said second detector output is connected to said symbol processing device.
4. The system according to claim 1, wherein said first detector is a blind minimum mean square error detector.

5. The system according to claim 1, wherein said second detector is a matched filter.

6. The system according to claim 1, wherein said second detector is a RAKE.

7. A method for multiuser detection of a received signal, the received signal including voice signals and data signals, the method comprising the steps of:

storing the received signal;

detecting the data signals and extracting the data signals from the received signal;

outputting the extracted data signals as soft symbols;

converting the soft symbols into hard symbols;

canceling the hard symbols from the stored received signal to extract the voice signals; and

detecting the individual voice signals, wherein the first and second detecting steps are performed by different types of detectors.

8. The method according to claim 7, wherein the first detecting step includes using a blind minimum mean square error detector.

9. The method according to claim 7, wherein the second detecting step includes using a matched filter.

10. The method according to claim 7, wherein the second detecting step includes using a RAKE.

11. A receiver comprising:

an antenna for receiving a plurality of communication signals of differing power levels, the plurality of communication signals including a high power level group of signals and a low power level group of signals;

a high data rate data detection device for detecting data of the high power level group of signals;

an interference canceling device for receiving the detected data of the high power level group of signals and canceling a contribution of the high power level group detected data from the plurality of communication signals, as an interference canceled signal; and

a low data rate data detection device for detecting data of the low power level group of signals from the interference canceled signal.

12. The receiver of claim 11 wherein the high data rate data detection device comprises a blind minimum means square error data detection device.

13. The receiver of claim 12 wherein the low data rate data detection device comprises a matched filter.

14. The receiver of claim 12 wherein the low data rate data detection device comprises a Rake.

15. The receiver of claim 12 wherein the low data rate data detection device comprises a multi-user detector.

16. A wireless transmit/receive unit (WTRU) comprising:

means for receiving a plurality of communication signals of differing power levels, the plurality of communication signals including a high power level group of signals and a low power level group of signals;

means for detecting data of the high power level group of signals;

high power level means for receiving the detected data of the high power level group of signals and canceling a contribution of the high power level group detected data from the plurality of communication signals, as an interference canceled signal; and

low power level means for detecting data of the low power level group of signals from the interference canceled signal.

17. The WTRU of claim 16 wherein the high power means comprises a blind minimum means square error data detection device.

18. The WTRU of claim 17 wherein the low power means comprises a matched filter.

19. The WTRU of claim 17 wherein the low power means comprises a Rake.

20. The WTRU of claim 17 wherein the low power means comprises a multi-user detector.

21. An integrated circuit comprising:

an input for receiving a plurality of communication signals of differing power levels, the plurality of communication signals including a high power level group of signals and a low power level group of signals;

a high data rate data detection device for detecting data of the high power level group of signals;

an interference canceling device for receiving the detected data of the high power level group of signals and canceling a contribution of the high power level group detected data from the plurality of communication signals, as an interference canceled signal; and

a low data rate data detection device for detecting data of the low power level group of signals from the interference canceled signal.

22. The integrated circuit of claim 21 wherein the high data rate data detection device comprises a blind minimum means square error data detection device.

23. The integrated circuit of claim 22 wherein the low data rate data detection device comprises a matched filter.

24. The integrated circuit of claim 22 wherein the low data rate data detection device comprises a Rake.

25. The integrated circuit of claim 22 wherein the low data rate data detection device comprises a multi-user detector.